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## NOTICE OF ALLOWANCE AND FEE(S) DUE

7590

10/08/2008

PAUL D. GREELEY, ESQ.  
OHLANDT, GREELEY, RUGGIERO & PERLE, L.L.P.  
10th FLOOR  
ONE LANDMARK SQUARE  
STAMFORD, CT 06901-2682

EXAMINER

CHAN, SING P

ART UNIT

PAPER NUMBER

1791

DATE MAILED: 10/08/2008

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,798	01/21/2004	Cherie R. Kagan	YOR92000018US2	9993

TITLE OF INVENTION: PATTERNING SOLUTION DEPOSITED THIN FILMS WITH SELF-ASSEMBLED MONOLAYERS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	01/08/2009

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

## HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

**IMPORTANT REMINDER:** Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

# **PART B - FEE(S) TRANSMITTAL**

**Complete and send this form, together with applicable fee(s), to:** Mail **Mail Stop ISSUE FEE**  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, Virginia 22313-1450**  
**or Fax** **(571)-273-2885**

**INSTRUCTIONS:** This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

7590 10/08/2008

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Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

## **Certificate of Mailing or Transmission**

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/761,798 01/21/2004

Cherie R. Kagan

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nonprovisional	NO	\$1510	\$300	\$0	\$1810	01/08/2009

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHAN, SING P	1791	156-230000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.  
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 \_\_\_\_\_  
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 \_\_\_\_\_  
 3 \_\_\_\_\_

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee  
☐ Publication Fee (No small entity discount permitted)  
☐ Advance Order - # of Copies \_\_\_\_\_

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.  
☐ Payment by credit card. Form PTO-2038 is attached.  
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number \_\_\_\_\_ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature \_\_\_\_\_ Date \_\_\_\_\_  
 Typed or printed name \_\_\_\_\_ Registration No. \_\_\_\_\_

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

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EXAMINER

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## Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 110 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 110 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

**Notice of Allowability****Application No.**

10/761,798

**Applicant(s)**

KAGAN ET AL.

**Examiner**

SING P. CHAN

**Art Unit**

1791

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to an amendment filed on September 2, 2008.
2. ☒ The allowed claim(s) is/are 1,3,4,9-13,15,16,23-27 and 33.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some\* c) ☐ None of the:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.  
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached  
1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.  
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.  
**Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).**
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. The restriction of species issued in the office action dated October 19, 2005 is withdrawn since applicant has cancelled the elected species and amended the claims to recite the non-elected species. Therefore, all previously withdrawn claims are re-joined and examined on the merits.

### **EXAMINER'S AMENDMENT**

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Thomas A. Beck on September 26, 2008. The examiner contacted Mr. Beck to get permission to amend the claims to place the application in condition for allowance. Mr. Beck agrees with the examiner and allowed the examiner to amend the claims by examiner amendment to add the need limitations and cancel claims that would be objected. Further permission was given by Mr. Beck on September 30, 2008 for amending the Specification.

The application has been amended as follows:

In claim 1, line 32, "and said thin film is not a monolayer" is inserted after "molecules and/or atoms;"

In claims 15 and 16, the dependency is changed from claim 14 to claim 1.

In claim 33, line 1, "comprising" is inserted between "a patterned thin film" and ", immersing a substrate" and on line 56, "and said thin film comprising a plurality of layers of molecules and/or atoms and is not a monolayer" is inserted after "has a discontinuous pattern;"

Claims 14, 17-21 and 30-32 are cancelled.

In the Specification, before "Background of the invention," inserts "This application is a continuation in part of application 09/556,952, now Patent Number 6,887,332."

***Allowable Subject Matter***

3. Claims 1, 3, 4, 9-13, 15, 16, 23-27, and 33 are allowed.

The following is an examiner's statement of reasons for allowance: The claims recite a method of forming a patterned thin film. The method includes immersing a substrate, selected from the group consisting of a metal, a metal oxide, a semiconductor, a metal alloy, a semiconductor alloy, a polymer, an organic solid and a combination thereof, into a surface derivatizing liquid solution of an organic molecular species, said organic molecular species having reactive functional head groups and tail groups; said substrate being immersed in contact with said liquid solution of said organic molecular species at a temperature and for a time period sufficient to allow said functional head group to chemically react with and chemically bind to and pack onto a surface of said substrate and interact with adjacent molecules to form a single chemical entity which is a relatively ordered molecular monolayer that is chemically bound to said substrate forming a self-assembled mono-molecular layer; said tail group provides

means for chemical differentiation of patterned and unpatterned regions of a coated surface; withdrawing said substrate containing said self-assembled mono-molecular layer thereon and placing a mask having one or more transparent and opaque regions onto a top surface of said self-assembled mono-molecular layer on said substrate; exposing said self-assembled molecular layer to radiation, modulated spatially in intensity in regions defined by said one or more of said regions in said mask transparent to radiation with the result that said self-assembled mono-molecular layer absorbs incident radiation in said transparent regions, thereby only modifying/removing said self-assembled mono-molecular layer beneath said transparent regions of said mask; producing a chemically differentiated surface between patterned and unpatterned regions of said substrate surface, so that after modification, said self-assembled mono-molecular layer has a discontinuous pattern; immersing said substrate containing said self-assembled mono-molecular layer having said discontinuous pattern into a liquid dipping solution of a thin film material in for a time sufficient to allow a thin film to be physically adsorbed to said substrate forming a thin film comprising a plurality of layers of molecules and/or atoms; and said thin film is not a monolayer; removing said substrate from said liquid dipping solution to obtain a patterned article having thin film material only in certain regions thus forming a patterned thin film on said substrate surface; and wherein after said immersion treatment, said patterned thin film having been formed only on a surface of said substrate is not coated with said self assembled monolayer and the original self-assembled monomolecular layer has a discontinuous pattern; wherein because said patterned thin film is formed only on a said surface of

said substrate not coated with said self-assembled monolayer there is not need for further post-deposition processing. Clem et al discloses a method of forming self-assembled monolayer or SAM formed of linear or branched alkyl or other hydrocarbon spacer, i.e. organic molecular species (Col 12, lines 23-37) and thin film on surfaces. The method includes forming a pattern onto a substrate with an applicator, i.e. a stamp, by coating the SAM onto the protrusions of the stamp, applying the stamp to the substrate and removing the stamp from the surface of the substrate, applying a sol-gel precursor to the SAM coated substrate by dip coating or spin casting, which the precursor is in liquid form and after heat treatment, forming an amorphous oxide film at the unpatterned region, i.e. thin film, but the patterned region with the SAM, the thin film adhered poorly and easily removed by thermal and/or mechanical agitation, i.e. without forming covalent bonding (Col 6, lines 14-36), wherein the thin film is in the order of micron or submicron range (Col 5, lines 46-55), which is not a monolayer. Furthermore, Clem et al recites the SAM includes a first end with functional group that binds to the desired surface (Col 10, lines 27-30) and a second end with functional group that selected to bind to particular material in any of a variety of functionalities (Col 11, lines 36-39), for example a prepolymer may be applied to the surface wherein the prepolymer is compatible with the exposed functionality of the SAM and incompatible with the surface of the substrate, the prepolymer assembles on the SAM and then can be polymerized but if the prepolymer is incompatible with the functionality of the SAM and compatible with the surface of the substrate, the prepolymer will assemble in a pattern complementary to the pattern of the SAM (Col 18, line 56 to Col 19, line 21), which does



not coat the SAM and therefore, does not coat the surface covered by the SAM and the SAM will prevent the prepolymer from coming in contact with SAM coated surface or coat it. Furthermore, since the blocking agent or SAM has a functionality incompatible with the prepolymer and assemble in a pattern complementary to the pattern of SAM, none of the prepolymer would be on the SAM and therefore, does not required addition post-deposition processing to remove the prepolymer from the SAM (Col 18, 56 to Col 19, line 2) and another embodiment also recites at various throughput rates of CVD, which result in selective CVD only at regions not protected by the blocking agent (e.g. SAM) (Col 8, lines 16-19). Clem et al does not discloses immersing the substrate in a solution of SAM, exposing the SAM to radiation with a mask, modifying/removing the SAM from the region exposed to the radiation to form patterned and unpatterned region, immersing the patterned substrate in a solution of thin film material, wherein the material is deposited on to the SAM if using a sol-gel process. Furthermore, Clem et al is silent as to if the prepolymer is applied by dipping or immersion and there is a further deposition process of either CVD or sol-gel process to applying the thin film. Sugimura et al (Micropatterning of Alkyl- and Fluoroalkylsilane Self-Assembled Monolayer Using Vacuum Ultraviolet light, Langmuir 2000, 16, Page 885-888) discloses a method of patterning SAM using vacuum ultraviolet light. The method includes coating SAM onto the substrate with CVD, photopatterning using vacuum UV light and a mask to remove or pattern the SAM. (Page 886, Col 1, line 21 to 38) Sugimura et al is silent as to the method includes immersing the substrate in a solution of SAM and applying the thin film material by immersing the patterned substrate in the solution of thin film material and

the thin film material only coat the exposed substrate surface. Calvert et al (U.S. 6,348,240) discloses a method of metallization of the surface. The method includes applying a SAM to the substrate by applying the substrate to a solution of the SAM (See Example 3, Col 8, line 66 to line 17), patterning the SAM by photolithographically using deep UV light and immersing the patterned substrate in an electroless plating bath, and applying metal coating only onto the SAM. (Col 6, lines 5-38) Calvert et al is silent as to the thin film of metal is applied only on the exposed surface of the substrate. Fukushima et al (U.S. 6,582,767) is cited by the examiner but is not a proper prior art since the application has priority to application 09/556,952, which is now patent number 6,887,332. Fukushima et al discloses a method of forming a metal pattern. The method includes applying a silicon polymer to the substrate, applying a solution contenting a salt of metal with a standard oxidation-reduction potential of at least 0.54 volt, applying a SAM using micro-stamping process onto the silicon polymer film, effecting electroless metal plating and forming pattern of metal only on the region of the silicon polymer thin film not covered by SAM. (Col 3, lines 34-67) As cited above, Fukushima et al is not a proper prior art of the instant application has an earlier priority date of April 21, 2000. A search of prior art of record did not disclose reference or references in combination with the recited features.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SING P. CHAN whose telephone number is (571)272-1225. The examiner can normally be reached on Monday-Thursday 7:30AM-11:00AM and 12:00PM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Philip C. Tucker can be reached on 571-272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sing P Chan/  
Acting Examiner of Art Unit 1791

/Philip C Tucker/  
Supervisory Patent Examiner, Art Unit 1791